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After the persons are dressed they pass into another room, where they reclaim any bundles they may have had. They are inspected by the foreman in charge of the plant, and all are vaccinated.

The time required for sterilization of clothing is from 25 to 35 minutes, depending on the amount of clothing in the chamber. The effectiveness of this process was determined by wrapping a thermometer inside bundles of clothing placed in different parts of the chamber load, top, bottom, middle, and ends, until the operator learned from such tests exactly how long to expose the clothing. Lice and their eggs are killed by a very short exposure to 212° F., but the higher temperature is easily obtained and is held to insure efficiency.

In connection with this subject the Public Health Service has recently issued the following interesting and instructive reprints which deal with effective methods of killing lice. Copies of these publications may be obtained free of charge by writing to the United States Public Health Service, Washington, D. C.

293. Methods of Destroying Lice. Extract from a report in the *British Medical Journal*. August 6, 1915.

370. Destroying Lice on Typhus Fever Suspects. By S. B. Grubbs. October 20, 1916.

489. Carbon Tetrachloride Vapor as a Delousing Agent. By M. H. Foster. October 25, 1918.

TRENCH FEVER: A SUMMARY FROM THE LITERATURE.

By MAURICE BUCHHOLTZ, Acting Assistant Surgeon, United States Public Health Service.

Definition.

Trench fever is a blood infection communicable from man to man by means of the louse and possibly other parasites. There are no pathognomonic signs or symptoms recognized. It is not fatal, but the morbidity resulting from it exceeded that from any other disease on the Western Front. Many are permanently unable to resume their former duties, and some pass back to civil life incapacitated—a charge on the State. The disease may arise and spread wherever the body louse is prevalent, provided persons already infected are sent there from endemic areas.

Symptoms.

The onset of the disease is usually sudden, but in some cases a gradual onset is observed. The disease is characterized by recurrent pyrexia, headache, giddiness, pain in the back and limbs (chiefly in the legs, and of considerable severity), a slow pulse in comparison to the degree of fever, conjunctival congestion, sweating, polyuria, a moderate degree of leucocytosis at the height of the fever, with evidence of blood infection and involvement of the spleen and, in

some of the cases, of the liver also. A certain number of the patients pass into a stage of chronic ill-health, that is, they suffer from recurrent pains in the limbs, headache, and nervous manifestations such as mental depression, excessive tendency to sweating, disordered action of the heart, mild degree of anemia, and some loss of weight. Damp weather produces exacerbation of the pains in the late stages of the disease. The infection, in some cases, is very persistent, and acute febrile relapses may occur after months of quiescence.

Prodromal symptoms in the cases of gradual onset have been noted in the following order of frequency: Pain in the head, pain all over, weakness, pain in the legs, malaise, and dyspnoea. The prodromal period lasts for two days or longer, the severity of the symptoms gradually increasing during the first few days. In a relapse the symptoms are often more severe than in the initial attack.

The headache associated with trench fever is usually frontal in character and behind the eyes, but may be bitemporal or occipital. It is most severe, persistent, commonly recurrent, and is not associated with tenderness of the scalp. When occipital it is often accompanied by stiffness in the back of the neck. The pain in the limbs is either (a) dull aching or gnawing, more or less continuous, always worse at night, or (b) acute pain, shooting or stabbing in character, which may last many hours, especially at night. The pain is nearly always felt in the bones and most frequently in the tibia.

After a few days the general pains subside and localized pain becomes prominent. This is usually symmetrical, varying from day to day. The joints may be painful and stiff, but there is no swelling. Sometimes the pain in the right iliac region is so severe as to give rise to the diagnosis of appendicitis. The spleen is palpable two fingers breadth below the costal margin. In a number of the cases there is alternately shivering and sweating, which occurs several times in the course of a single day or night. Another symptom is frequent micturition, not painful but associated with a great increase of urine. Polyuria occurs as the temperature falls; the pulse is slow; affections of the respiratory tract are usually conspicuous by their absence. Areas of tenderness are frequently associated with the pains and may involve all the structures from the skin down. During an acute attack the patient's general condition obviously deteriorates and he presents an appearance of exhaustion. In addition to this he becomes anemic and steadily loses weight.

For a period varying from a few days to about a fortnight from the onset of the disease the acuteness of the patient's pain persists, especially in portions of his limbs; and walking increases the pain. If a recurrence set in, even though quite late, the recurrence may be more severe than the original attack.

Two clinical types have been observed. In one there is a short evanescent fever lasting from a few days to a week and frequently followed after a few days of apyrexia by a single short relapse. In the other there is a series of febrile relapses, interrupted by periods of apyrexia.

Pathological Changes.

Although the mode of transmission has now been well established, the causative organism remains to be found. So far as the blood is concerned, there is evidence of abnormal activity of bone marrow. A moderate and rapidly varying leucocytosis precedes and accompanies the fever waves. In afebrile intervals the mononuclear elements are relatively increased. The urine usually shows a trace of albumin; a true nephritis, however, is rare. With the fall of temperature the amount of urine increases.

Differential Diagnosis.

The most important disease from which trench fever must be differentiated is influenza. The two diseases have in common the sudden onset, with fever and generalized pains. In trench fever the prostration, however, is usually less than it is in influenza, and there are no signs of inflammation of the respiratory tract, while in influenza the shin pains and relapsing type of fever are absent.

Prognosis.

About 90 per cent of all cases respond quickly to the ordinary symptomatic treatment and return to duty in a few weeks. In the remaining 10 per cent the disease pursues a more obstinate course and the average duration of disability is from five to six months. In the chronic cases the patient's weight is the best guide to prognosis. As recovery takes place the weight steadily increases.

Sequelæ.

Chief among the sequelæ of trench fever are disordered action of the heart (the so-called irritable heart of soldiers), neurasthenia, and myalgia or "rheumatism."

The first-mentioned is characterized by breathlessness on exertion, palpitation of the heart, pain over the precordium, and giddiness. Although the heart is not enlarged and the sounds are normal, the patient is markedly exhausted. The condition ultimately may lead to neurasthenia.

The clinical phenomena of disordered action of the heart embrace profuse sweating, flushing, headache, throbbing of the vessels of the neck, tremulousness, and, in some cases, discomfort in the throat and chest. These phenomena have been attributed to hyperthyroidism;

but the administration of thyroid extract by no means tends to exaggerate the symptoms of disordered action of the heart; on the contrary it causes definite relief.

The Transmission of Trench Fever: Summary of Evidence From Experimental Work.

1. The whole blood from febrile cases of trench fever up to the 51st day of the disease, when injected intravenously, is capable of producing the disease. The incubation period in such infections varies greatly—from 5 to 20 days.

2. The virus as contained in the circulating blood is destroyed by the addition of distilled water in large quantities.

3. The bites alone of infective lice appear not to produce trench fever.

4. The excreta of infective lice when applied to a broken surface of skin do readily produce trench fever. The incubation period of such infections is fairly constant and averages 8 days.

5. The excreta passed by lice fed on trench fever patients are not infective until the expiration of not less than 7 days from the commencement of the feeding on trench fever blood, thus indicating either a developmental cycle in the louse or a period during which the organism multiplies.

6. Once lice are infective they remain so until at least the 23d day from the date of their infection.

7. The virus of trench fever, as contained in infected louse excreta, is capable of withstanding drying at room temperature, exposure to sunlight, keeping for not less than 16 days, and heating to 56° C. for 20 minutes.

8. A temperature of 80° C. for 10 minutes destroys the virus—a fact which indicates that it is not a spore-bearing organism.

9. The bodies of infected lice when crushed on the broken skin are capable of producing trench fever.

10. Active trench fever blood equivalent to the content of 11 lice does not produce trench fever when rubbed into the broken skin.

11. Infection probably does not take place by the mouth or inhalation.

12. The excreta of lice are not normally capable of producing trench fever.

13. Trench fever infected lice do not transmit the disease to their offspring.

14. Some attacks of trench fever may be afebrile throughout.

15. The percentage of individuals naturally immune to trench fever is exceedingly small.

16. Old age is no bar to infection.

17. Such immunity as results from an attack of trench fever is not permanent and may persist only so long as the individual shows evidence of the disease.

18. Even as late as the 79th day of the disease a patient's blood may remain infective and be capable of infecting lice fed on such a patient while febrile.

19. The different varieties of trench fever result from differences in persons infected rather than from differences in the sources of infection.

Prophylaxis.

From what has been said it is clear that prophylactic measures must concern themselves chiefly with the delousing of infested persons. In addition to this, the application to the underclothing of a mixture compound of crude naphthalene, 4 parts, and soft soap, 1 part, is recommended.

Lousy clothing should be disinfested by heat or other effective procedure. Billets, dugouts, and like places should be fumigated with sulphur dioxide or hydrocyanic acid gas in order to kill the lice.

Treatment.

Rest, combined with moderate exercise, and thyroid therapy (not specific treatment) reduces the incidence of disordered action of the heart, provided the treatment is begun early enough. Aside from this, the treatment is purely symptomatic.

LETHARGIC ENCEPHALITIS.

Following the announcement in the Public Health Reports for February 21 concerning the reported prevalence of so-called "lethargic encephalitis" in various parts of Europe, it was perhaps to be expected that cases of this disease would shortly be reported from various parts of this country. Such, indeed, has been the case. In general, the diagnosis appears to have been based largely on the condition of stupor and there is, of course, no means whatever of determining whether or not the cases reported are identical with those observed in Europe. From the meager information at present available, a considerable number appear to have followed an attack of influenza, but this is hardly surprising in view of the widespread prevalence of that disease during the past six months.

As a matter of record, and without thereby expressing any opinion as to the nature of the condition termed "encephalitis lethargica," we give herewith a summary of the cases officially notified to the Public Health Service.